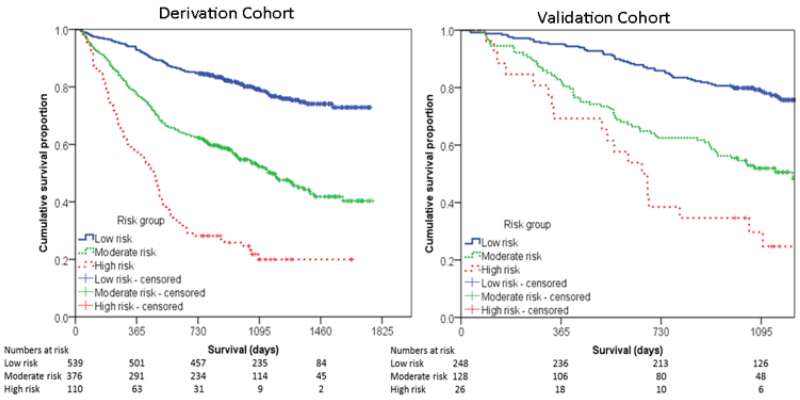
Greater Manchester Risk Stratified Follow-up after Lung Cancer Surgery Pathway

A study undertaken at Wythenshawe Hospital analysed the pathological reports of 1034 patients that underwent surgical resection of non-small cell lung cancer from 2011 to 2014. This data was linked to survival data and used to develop the ***'LNC-PATH'*** (Lymphovascular invasion, N-stage, adjuvant Chemotherapy, Performance status, Age, T-stage, Histology) risk stratification score. This score stratifies patients according to the risk of death in the first two years following surgical resection using low-risk, moderate-risk and high-risk groups: 83.8% of patients in the low-risk group survived two years after surgery compared to 55.6% in the moderate-risk group and 26.2% in the high-risk group. The LN-PATH risk stratification score was validated in a multicentre external dataset from Leeds, Bristol and Glasgow surgical centres (402 patients). The score was shown to perform moderately well with an Area Under the Receiver Operating Characteristic curve (AUROC) value of 0.76 (95% CI: 0.73–0.79) and 0.70 (95% CI: 0.64–0.76) in the derivation and validation cohorts respectively. In this study approximately 60% of all patients were classified as low risk, 30% as moderate risk and 10% as high risk.

The *LNC-PATH* Risk Stratification Score

Variable	Score
Lymphovascular invasion (LN-PATH)	
No	0
Yes	0.5
N stage (LN-PATH)	
pNx	0
pN0	0
pN1	1
pN2	1
Adjuvant chemotherapy (LNC-PATH)	
No	0
Yes	1
Performance Status (LN-PATH)	
0	0
1	0
2/3	1
Age (years) (LN-PATH)	
<75	0
≥75	1
T stage (LN-PATH)	
pT1	0
pT2	1
pT3	2
pT4	2
Histology sub-type (LN-PATH)	
Adeno – lepidic	0
Adeno – papillary/micropapillary	0.5
Adenocarcinoma – Acinar	0.5
Adeno - unknown	0.5
Squamous Cell Carcinoma	1
NSCLC – other	1.5
Adenocarcinoma - Solid	1.5
Large cell NSCLC	2.5

Kaplan-Meier Survival groups for the high, moderate and low risk groups in the derivation and validation cohorts



Based on the results of this study a Greater Manchester Risk Stratified Follow-up following Lung Cancer Surgery Pathway has been designed aimed at intensifying follow-up in those at highest risk of death and de-intensifying follow-up for those at lowest risk. The programme suggests a combination of clinic and telephone consultations and differing imaging protocols according to risk groups. These consultations could be undertaken by respiratory physicians or specialist nurses according to local services.

Low risk **= ≤ 3** Moderate risk **= 3.5-4.5** High risk **≥ 5**

4-6 week post surgery review
Holistic needs assessment. Risk stratification *(LNC-PATH)*
MR brain for high risk patients without pre-operative brain imaging

Low Risk
3 monthly assessments:
Predominatly telephone
CT imaging:
6 months: contrast
18 months: LDCT

Moderate Risk
3 monthly assessments:
Alternating clinic/telephone
CT imaging:
6 months: contrast
12 months: contrast
18 months: contrast

High Risk
6 week assessments:
Alternating clinic/telephone
CT imaging:
6 months: contrast
12 months: contrast
18 months: contrast
24 months: contrast
Brain imaging:
6 months: MR
18 months: MR

Low Risk (first 24 months following surgical resection)

	3	6	9	12	15	18	21	24
Telephone FU								
Clinic FU								
CT Chest		Contrast				LDCT		

Moderate Risk (first 24 months following surgical resection)

	3	6	9	12	15	18	21	24
Telephone FU								
Clinic FU								
CT Chest		Contrast		Contrast		Contrast		

High Risk (first 24 months following surgical resection)

	3	4.5	6	7.5	9	10.5	12	13.5	15	16.5	18	19.5	21	22.5	24
Telephone FU															
Clinic FU															
CT Chest			Contrast				Contrast				Contrast				Contrast
MR brain															

Con = Contrast

Following completion of 24 months of risk stratified follow-up all patients revert to a programme of annual LDCT & clinic assessment with a 6 month telephone assessment (plus annual autofluorescence for those patients with resected squamous cell carcinoma)

All patients (months 24-60)

	30	36	42	48	54	60
Telephone FU						
Clinic FU						
CT Chest	LDCT		LDCT		LDCT	

Notes

- ✓ It is important all patients are provided with contact information for the survivorship service to facilitate self-reporting of symptoms and timely review when required. Rapid access into the telephone or clinic service is required.
- ✓ The suggested surveillance programmes begin from the date of surgery. For those patients undergoing adjuvant therapy the initial appointments may be undertaken within the oncology service until formally handed back to the survivorship services
- ✓ Survivorship is a holistic process and community based exercise programmes, smoking cessation and nutritional support should be embedded within the service